**Daily Lesson Plan**

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| **Course:** Grade 11 Academic Biology | **Course Code:** SBI3U |
| **Unit Title:** Plants | **Topic:** Self-Sustaining Communities |
| **Lesson Title:** Research in Self-Sustaining Agriculture | |
| **Category:** Relating Science to Technology, Society and Environment | |

**Curriculum Expectations addressed:**

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| A1.3 identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately  A1.7 select, organize, and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation  A1.9 analyse the information gathered from research sources for logic, accuracy, reliability, adequacy, and bias  F1.1 evaluate, on the basis of research, the importance of plants to the growth and development of Canadian society (e.g., as a source of food, pharmaceuticals, Aboriginal medicines, building materials, flood and erosion control; as a resource for recreation and ecotourism) [IP, PR, AI, C]  F1.2 evaluate, on the basis of research, ways in which different societies or cultures have used plants to sustain human populations while supporting environmental sustainability (e.g., sustainable agricultural practices in developing countries such as crop rotation and seed saving;  traditional Aboriginal corn production practices) [IP, PR, AI, C] |

**Assessment Tasks/Activities, Strategies and Recording Devices:**

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| **Tasks/Activities** | **Assessment Strategies** | **Assessment Types** | **Recording Devices** |
| -Discussion and questions after video  -Expert Research Groups  -Critical analysis of research networks  -Ecological Design research assignment | -observation  -concept map and presentation  -advertisement | A for L  A as L  A of L | -teacher notes  -concept map  -rubric |

**Instructional Focus:**

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| **Teaching/Learning Strategies:**   * Ted Talk Video followed by discussion and questions * Research in groups, create concept maps and present to class * Critically analyze research networks * Research components of ecological design and produce advertisements | **Student Groupings:**   * as a class * groups of 3-4 self-determined * predetermined pairs based on ability |
| **Differentiation Strategies:**  For research groups: roles ( researcher, concept mapper, speaker) are self-assigned.  Advertisements: option of topics, option of any medium i.e. poster, video, audio, pamphlet, brochure etc. | |
| **Adaptations/Accommodations for Exceptional Students:**  For the video subtitles are possible, video also posted online for later viewing.  For discussion write all questions large and neatly on the board and read aloud.  For group research scaffolding for exceptional students can be provided in concept mapping.  For research assignment extend due date if need be. Spend time on building research skills. | |

**Notes and Reminders**

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| -this is a two-day lesson plan, both days meet in the computer lab  -collect concept maps  -ensure students get class time for research assignment and ensure students leave with a topic and at least one peer reviewed article |

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| **Lesson Outline** | | | |
| **Objectives (learning goals):** | | | |
|  | **Minds On** | Inspiring self-sustaining community in other cultures   1. Show Green School video: <http://www.ted.com/talks/lang/en/john_hardy_my_green_school_dream.html> 2. Discuss the self-sustainable community shown in the video 3. Ask students if they know what biofuels, renewable bioenergy, biomass feedstock and self-sustaining communities are. | **Rationale for choice of T/L Strategy:**  -Introduces the topic of sustainable communities in different cultures  -Students get to discuss amongst peers  -Teacher can gauge prior knowledge |
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|  | **Action** | How is Canada striving towards a self-sustaining community?   1. Divide students into 8 groups 2. Assign each group a number from 1-8. Each number corresponds to an ABIP network (Appendix A). 3. Each member of every group is assigned the role of researcher, concept mapper, or speaker. 4. Students have to research their network and organize their information in the form of a concept map. 5. Speaker will present information about network to the class in a 2-3 minute presentation. | **Rationale for choice of T/L Strategies:**  -Makes the connection between sustainable communities in other cultures and in Canada  -Students will become aware of government-funded research projects in Canada  -Students get the opportunity to engage in their own research.  -Concept mapping refines organizational skills and make it easier for students to understand each network |
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|  | **Consolidation and Debrief** | Day 2: Thinking critically about current research in Canada:   1. Review research networks studied in last class. Write networks on board along with main purpose. 2. Students Form expert groups again and critically evaluate the value of each network. 3. Pose questions about how it is valuable and if the amount of money being spent on it is valid. Do you support the research? 4. In their groups ask students to decide which network they found most important and valuable. 5. One representative from each group voices their opinion with regards to how the particular network will be most beneficial in reaching a self-sustaining society in Canada to the rest of the class. | **Rationale for choice of T/L Strategy:**  **-**This will require students to think critically about current research  -Students will get a chance to debate amongst peers about what is more important for Canadian agriculture practices  -Gives students an opportunity for |
| 20 |
|  | **Next Steps** | What are the components of a self-sustaining community?   1. Pick an aspect of ecological design (permaculture, ecological building, green production, alternative energy, etc.) find an article on that topic. 2. Create infomercial/ advertisement in the form of pamphlet, brochure, poster, video, or audio. 3. Students will make a video (5 mins) of their infomercial advertisement put it on Youtube and send me the link 4. I will embed all videos on Prezi and show it the class | **Rationale for Choice of T/L Strategy:**  -Gives students the chance for individual research outside of class  -Giving options differentiates project  -Students will learn aspects of ecological design in depth |
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**Teacher Notes**

Lesson Plan: Self-Sustaining Communities

Grade and Unit: Grade 11 - Plants: Anatomy, Growth, and Function

**Minds On (20 minutes):**

1. Have key words (biofuels, alternative renewable energy, permaculture, self-sustaining) written on the board. Ask students to think about them while watching the video.
2. Show Ted Talk video (14 minutes): This inspirational video will open a window into self-sustaining communities in other cultures for students.

<http://www.ted.com/talks/lang/en/john_hardy_my_green_school_dream.html>

1. Discussion (7 minutess): After the video, ask students to highlight techniques being used in the video, and draw connections back to how/if they can be implemented in Canada. Probe students for knowledge of biofuels, biochemicals, renewable bioenergy, permaculture, etc.

**Group Research (50 minutes):**

1. Introduce Agricultural and Bioproduct Innovation Program (ABIP) and the 8 research networks funded.
2. Divide class into 8 groups of 3-4 students, number groups 1-8 and assign an ABIP research network
3. Each student in every group will be assigned a role of researcher, concept mapper, or speaker.
4. Direct students to resource sheet posted online (appendix A), for starting off their research. Give students 25 minutes for research.
5. Instruct concept mappers in each group to organize their researched information into a concept map.
6. Speaker from each expert group will present their findings to the class with help of concept map in 2-3 minutes.

Day 2:

**Consolidation for previous days work-Thinking Critically about Current Research (15 minutes):**

1. Ask students to return to their expert research groups.
2. Ask students to come up to the board to write down a research network studied the previous day and the main goal of the research conducted in that network.
3. Ask students to think about the value of these research networks. Pose questions like which network they think is most valuable and why, is the amount of money funded for it valid? How will it help create sustainable communities in Canada?
4. One representative from each group will voice the groups’ opinion to the rest of the class.

**Components of Ecological Design Research Assignment (50 minutes):**

1. Introduce assignment (Appendix B) to the class and assign pairs.
2. Go over required elements of the advertisement and the rubric provided on the assignment sheet.
3. Rest of the class time will be spent working on the assignment
4. Supervise students during research time, make sure students leave knowing their topics and having found at least one peer reviewed article on it.
5. Students have option of what medium they use for advertisement.
6. Once students have made their infomercial/advertisement ask them to make a 5 minute video of it and post it on Youtube. Once students send the Youtube link embed videos on Prezi to show to the class.

**APPENDIX A- ABIP Network Resource List**

Agricultural Bioproduct Innovation Program:

<http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1314803481043&lang=eng>

1. Industrial Oil Seed Network (IOSN):

<http://agwest.sk.ca/events/plantbio-oils08/Grushcow.pdf>

1. Cellulosic Biofuel Network (CBioN)

<http://www.cellulosic-biofuel.ca/cbnwiki/Main_Page>

1. Canadian Triticale Biorefinery Initiative (CTBI)

<http://www.ctbi.ca/>

1. Sustainable Cropping System Platforms for Biodiesel Feedstock Quantity and Quality (SBQQ)

<http://www.4fcrops.eu/pdf/madrid/Harker.pdf>

1. Agricultural Biorefinery Innovation Network for Green Energy, Fuels and Chemicals (ABIN)

<http://www.abin-ribba.com/>

1. Feed Opportunities from the Biofuels Industries (FOBI)

<http://www.ddgs.usask.ca/Portals/0/About_FOBI_FII_Mar9_2010.pdf>

1. Pulse Research Network (PURENet)

<http://www.pulsecanada.com/food-and-nutrition/research/on-going-research-projects>

1. BioPotato Network

<http://bioatlantech.nb.ca/site/news/item/46>

**APPENDIX B- Advertising Components of Ecological Design Research Assignment**

1. Research an aspect of ecological design seen in the Ted Talk (permaculture, ecological building, green production, alternative energy, etc.). Research must consist of at least one peer reviewed article.
2. Create infomercial/ advertisement for your component of ecological design in the form of pamphlet, brochure, poster, video, audio, (If you want to use another medium get my approval). The advertisement/ infomercial must include: Who, what, where, when, why, how, future vision/direction of the research.
3. Students will make a video (5 minutes max) of their infomercial/advertisement put it on Youtube and send me the link so that we can all watch it in class.

**Advertisement Research Assignment Rubric**

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|  | **Level 1** | **Level 2** | **Level 3** | **Level 4** |
| **Content accuracy/quality** | Topic is not understood or represented properly. No accurate facts are displayed | Understanding of topic is satisfactory. Few accurate facts are displayed | Topic is understood well. many accurate facts are displayed | Topic is thoroughly understood and represented. At least 7 accurate facts are displayed |
| **Required Elements** | Several required elements were missing. | All but 1 of the required elements are included | All required elements are included | Includes all required elements as well as additional information |
| **Mechanics/ Grammar** | There are many grammatical mistakes. | There are a few grammatical mistakes. | There are almost no grammatical mistakes. | There are no grammatical mistakes. |
| **Creativity** | Bland, no variability. No use of colour or diagrams. Boring, does not catch your attention. Interest, motivation, effort and time obviously absent | Some variability but overall not very interesting. Does not hold attention. Some effort is apparent. | Engaging, stimulating and appealing to the senses. Some interest, motivation, effort and time present. | Very engaging, stimulating, and appealing. Interest, motivation, effort and time obviously present. Originality in work is evident. |
| **Article** | Article not relevant to topic chosen | Article somewhat relevant to topic chosen | Article relevant to topic chosen | Excellent choice of article, very relevant and |

Scaffolding: Concept Map Template

Questions

Future direction

When

How

Why

Where

What

Who

ABIP Network